DOCUMENT-IDENTIFIER: US 20030166030 A1
TITLE: Methods to study and mechanisms of biofilm-related antibiotic resistance

Detail Description Paragraph:
[0129] The microtiter plate assay was modified to measure the increase in resistance developed by the wild type strain when growing in a biofilm. The wells of the microtiter dish are inoculated with bacteria and biofilms are allowed to form on the walls of the wells for 24 hrs in the absence of any shear force. After the biofilms had formed on the wells of the microtiter dish, the spent medium was replaced with the same media containing an antimicrobial agent. In this case, we used the aminoglycoside antibiotic tobramycin (Tb), an antibiotic that targets protein synthesis. Tb was selected because it is the primary antibiotic used to treat cystic fibrosis patients with chronic P. aeruginosa lung infections (Banerjee, D., and D. Stableforth, Drugs, 60(5):1053-64, 2000; Bonsignore, C. L., Pediatr Nurs. 24(3):258-9, 1998; Ratjen, F, Int J.Antimicrob Agents 17(2):93-6, 2001). After exposing the biofilms to Tb for 24 hours, the antibiotic-containing medium is removed and replaced with fresh antibiotic-free medium. Any bacteria surviving in the biofilm outgrow and repopulate the planktonic phase of the wells. Viable cells were detected by plating on rich medium. Using this assay, we determined that the minimal bacteriocidal concentration (MBC) of Tb for the wt biofilm grown cells is 0.4 mg/ml. The MBC of planktonic cells was determined by adding the antibiotic to cells at the time they were inoculated into the microtiter dish, incubating the cells in the presence of antibiotic for 24 hrs, and assessing cell viability by plating on rich medium. Using this assay, the planktonic MBC was shown to be 0.008 mg/ml, a 50-fold decrease relative to the biofilm-grown bacteria.

Previous Doc Next Doc Go to Doc#

1: Mol Microbiol. 2002 May;44(4):903-15.

Comment in:
J Urol. 2003 Jul;170(1):335.

Structural basis of tropism of Escherichia coli to the bladder during urinary tract infection.

Hung CS, **Bouckaert J**, **Hung D**, **Pinkner J**, **Widberg C**, **DeFusco A**, **Auguste CG**, **Strouse R**, **Langermann S**, **Waksman G**, **Hultgren SJ**.

Department of Molecular Microbiology, Washington University School of Medicine, St. Louis, MO 63110, USA.

The first step in the colonization of the human urinary tract by pathogenic Escherichia coli is the mannose-sensitive binding of FimH, the adhesin present at the tip of type 1 pili, to the bladder epithelium. We elucidated crystallographically the interactions of FimH with D-mannose. The unique site binding pocket occupied by D-mannose was probed using site-directed mutagenesis. All but one of the mutants examined had greatly diminished mannose-binding activity and had also lost the ability to bind human bladder cells. The binding activity of the mono-saccharide D-mannose was delineated from this of mannotriose (Man(alpha 1-3)[Man(alpha 1-6)] Man) by generating mutants that abolished D-mannose binding but retained mannotriose binding activity. Our structure/function analysis demonstrated that the binding of the monosaccharide alpha-D-mannose is the primary bladder cell receptor for uropathogenic E. coli and that this event requires a highly conserved FimH binding pocket. The residues in the FimH mannose-binding pocket were sequenced and found to be invariant in over 200 uropathogenic strains of E. coli. Only enterohaemorrhagic E. coli (EHEC) possess a sequence variation within the mannose-binding pocket of FimH, suggesting a naturally occurring mechanism of attenuation in EHEC bacteria that would prevent them from being targeted to the urinary tract.

Search	Most Recent Queries	Time	Resu
#15	**Related Articles** for **PubMed** (Select **16624825**) sort by: **PublicationDate**	18:10:20	3
#14	Search **catch bond mannose**	18:09:36	
#12	Search **tensile force mannose**	18:08:02	
#1	Search **fimh bond strength**		

WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Thursday, March 29, 2007

Hide?	Set Name	Query	Hit Count
		DB=USPT; PLUR=YES; OP=OR	
☐	L1	i-fabsdam and fabdb-l	0
☐	L2	fabsdam and fabdbl	0
☐	L3	fabsdam and fabdb	0
☐	L4	fabsdam and fabsdb	0
☐	L5	ifabsdam and fabsdbl	0
☐	L6	i-fabsdam and fabsdbl	0
☐	L7	i-fabsdam and fabsdb-l	0
		DB=PGPB; PLUR=YES; OP=OR	
☐	L8	i-fabsdam and fabsdb-l	1
		DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI; PLUR=YES; OP=OR	
☐	L9	flow$ near coli	48
☐	L10	L9 same increas$	4
☐	L11	L9 same increas$	4
☐	L12	increas$ near5 (adher$ or attach$ or binding)	72603
☐	L13	L12 and (fim or fimh or lectin or fim-h)	5900
☐	L14	L12 and (fimh or lectin or fim-h)	5822
☐	L15	L12 same (fimh or lectin or fim-h)	222
☐	L16	L12 same (fimh or fim-h)	5
☐	L17	shear near force	37633
☐	L18	L17 and bacteria	2198
☐	L19	L17 same bacteria	142
☐	L20	l19 and mannose	7
☐	L21	l19 and monomannose	1
☐	L22	l19 and (man1)	1
☐	L23	l19 and mannop$	1
		DB=DWPI,JPAB,EPAB,USOC,USPT,PGPB; PLUR=YES; OP=OR	
☐	L24	(MONOMANNOSE | MONOMANNOSYL | MONOMANNOSYLATED | MONOMANNOSYLPHOSPHATE | MONOMANNOSYLPHOSPHORIC | MONOMANNOSIDE)!	26
☐	L25	(MAN1)!	319
☐	L26	(MAN1)!	319

☐	L27	(MONO-MANNOSE | MONO-MANNOSE-BSA | MONO-MANNOSYL | MONO-MANNOSYLATED)!	11
		DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI; PLUR=YES; OP=OR	
☐	L28	l14 and (fimbrae or fimbrial or fimbrium or pili or fimh or fim-h or (type-1 near pili) or pilin)	184
☐	L29	l17 and (fimbrae or fimbrial or fimbrium or pili or fimh or fim-h or (type-1 near pili) or pilin)	51

END OF SEARCH HISTORY

Glycoconj J. 1998 Jun;15(6):605-13.
PMID: 9881767 [PubMed - indexed for MEDLINE]

262: Schembri MA, Klemm P. Related Articles, Links

Heterobinary adhesins based on the Escherichia coli FimH fimbrial protein.
Appl Environ Microbiol. 1998 May;64(5):1628-33.
PMID: 9572927 [PubMed - indexed for MEDLINE]

263: Quintero EJ, Busch K, Weiner RM. Related Articles, Links

Spatial and Temporal Deposition of Adhesive Extracellular Polysaccharide Capsule and Fimbriae by Hyphomonas Strain MHS-3.
Appl Environ Microbiol. 1998 Apr;64(4):1246-1255.
PMID: 16349537 [PubMed - as supplied by publisher]

264: Pierres A, Benoliel AM, Bongrand P. Related Articles, Links

Use of a laminar-flow chamber to study the rate of bond formation and dissociation between surface-bound adhesion molecules: effect of applied force and distance between surfaces.
Faraday Discuss. 1998;(111):321-30; discussion 331-43.
PMID: 10822617 [PubMed - indexed for MEDLINE]

265: Hancox LS, Yeh KS, Clegg S. Related Articles, Links

Construction and characterization of type 1 non-fimbriate and non-adhesive mutants of Salmonella typhimurium.
FEMS Immunol Med Microbiol. 1997 Dec;19(4):289-96.
PMID: 9537754 [PubMed - indexed for MEDLINE]

266: Baorto DM, Gao Z, Malaviya R, Dustin ML, van der Merwe A, Lublin DM, Abraham SN. Related Articles, Links

Survival of FimH-expressing enterobacteria in macrophages relies on glycolipid traffic.
Nature. 1997 Oct 9;389(6651):636-9.
PMID: 9335508 [PubMed - indexed for MEDLINE]

267: Pan YT, Xu B, Rice K, Smith S, Jackson R, Elbein AD. Related Articles, Links

Specificity of the high-mannose recognition site between Enterobacter cloacae pili adhesin and HT-29 cell membranes.
Infect Immun. 1997 Oct;65(10):4199-206.
PMID: 9317027 [PubMed - indexed for MEDLINE]

268: Thankavel K, Madison B, Ikeda T, Malaviya R, Shah AH, Arumugam PM, Abraham SN. Related Articles, Links

Localization of a domain in the FimH adhesin of Escherichia coli type 1 fimbriae capable of receptor recognition and use of a domain-specific antibody to confer protection against experimental urinary tract infection.
J Clin Invest. 1997 Sep 1;100(5):1123-36.
PMID: 9276729 [PubMed - indexed for MEDLINE]

269: Sokurenko EV, Chesnokova V, Doyle RJ, Hasty DL. Related Articles, Links

Diversity of the Escherichia coli type 1 fimbrial lectin. Differential binding to mannosides and uroepithelial cells.
J Biol Chem. 1997 Jul 11;272(28):17880-6.
PMID: 9211945 [PubMed - indexed for MEDLINE]

270: el Tahir Y, Toivanen P, Skurnik M. Related Articles, Links

Application of an enzyme immunoassay to monitor bacterial binding and to measure inhibition of binding to different types of solid surfaces.
J Immunoassay. 1997 May;18(2):165-83.
PMID: 9134475 [PubMed - indexed for MEDLINE]

271: Melrose JR, van Vliet JH, Ball RC. Related Articles, Links

Continuous Shear Thickening and Colloid Surfaces.
Phys Rev Lett. 1996 Nov 25;77(22):4660-4663. No abstract available.
PMID: 10062594 [PubMed - as supplied by publisher]

272: Nilsson U, Striker RT, Hultgren SJ, Magnusson G. Related Articles, Links

PapG adhesin from E. coli J96 recognizes the same saccharide epitope when present on whole bacteria and as isolated protein.
Bioorg Med Chem. 1996 Nov;4(11):1809-17.
PMID: 9007266 [PubMed - indexed for MEDLINE]

273: Hubble J, Ming F, Eisenthal R, Whish W. Related Articles, Links

Progressive detachment of cells from surfaces: a consequence of heterogeneous ligand populations or a multi-site binding equilibrium?
J Theor Biol. 1996 Sep 21;182(2):169-71.
PMID: 8944147 [PubMed - indexed for MEDLINE]

274: Schembri MA, Pallesen L, Connell H, Hasty DL, Klemm P. Related Articles, Links

Linker insertion analysis of the FimH adhesin of type 1 fimbriae in an Escherichia coli fimH-null background.
FEMS Microbiol Lett. 1996 Apr 1;137(2-3):257-63.
PMID: 8998995 [PubMed - indexed for MEDLINE]

275: Hirose A, Elia M. Related Articles, Links

Kinetic ballooning mode with negative shear.
Phys Rev Lett. 1996 Jan 22;76(4):628-631. No abstract available.
PMID: 10061507 [PubMed - as supplied by publisher]

276: Klemm P, Schembri M, Hasty DL. Related Articles, Links

The FimH protein of type 1 fimbriae. An adaptable adhesin.
Adv Exp Med Biol. 1996;408:193-5. Review. No abstract available.
PMID: 8895793 [PubMed - indexed for MEDLINE]

277: Pallesen L, Poulsen LK, Christiansen G, Klemm P. Related Articles, Links

Chimeric FimH adhesin of type 1 fimbriae: a bacterial surface display system for heterologous sequences.
Microbiology. 1995 Nov;141 (Pt 11):2839-48.
PMID: 8535512 [PubMed - indexed for MEDLINE]

278: Sokurenko EV, Courtney HS, Maslow J, Siitonen A, Hasty DL. Related Articles, Links

Quantitative differences in adhesiveness of type 1 fimbriated Escherichia coli due to structural differences in fimH genes.
J Bacteriol. 1995 Jul;177(13):3680-6.
PMID: 7601831 [PubMed - indexed for MEDLINE]

279: Krogfelt KA. Related Articles, Links

Adhesin-dependent isolation and characterization of bacteria from their natural environment.
Methods Enzymol. 1995;253:50-3. No abstract available.

☐ 289: Klemm P, Krogfelt KA, Hedegaard L, Christiansen G. Related Articles, Links

The major subunit of Escherichia coli type 1 fimbriae is not required for D-mannose-specific adhesion.
Mol Microbiol. 1990 Apr;4(4):553-9.
PMID: 1972261 [PubMed - indexed for MEDLINE]

☐ 290: Beachey EH, Giampapa CS, Abraham SN. Related Articles, Links

Bacterial adherence. Adhesin receptor-mediated attachment of pathogenic bacteria to mucosal surfaces.
Am Rev Respir Dis. 1988 Dec;138(6 Pt 2):S45-8.
PMID: 2904779 [PubMed - indexed for MEDLINE]

☐ 291: James DW, Suslow TV, Steinback KE. Related Articles, Links

Relationship between Rapid, Firm Adhesion and Long-Term Colonization of Roots by Bacteria.
Appl Environ Microbiol. 1985 Aug;50(2):392-397.
PMID: 16346859 [PubMed - as supplied by publisher]

☐ 292: Haahtela K, Korhonen TK. Related Articles, Links

In Vitro Adhesion of N(2)-Fixing Enteric Bacteria to Roots of Grasses and Cereals.
Appl Environ Microbiol. 1985 May;49(5):1186-1190.
PMID: 16346793 [PubMed - as supplied by publisher]

☐ 293: Haahtela K, Tarkka E, Korhonen TK. Related Articles, Links

Type 1 Fimbria-Mediated Adhesion of Enteric Bacteria to Grass Roots.
Appl Environ Microbiol. 1985 May;49(5):1182-1185.
PMID: 16346792 [PubMed - as supplied by publisher]

☐ 294: Ohman L, Magnusson KE, Stendahl O. Related Articles, Links

Effect of monosaccharides and ethyleneglycol on the interaction between Escherichia coli bacteria and Octyl-Sepharose.
Acta Pathol Microbiol Immunol Scand [B]. 1985 Apr;93(2):133-8.
PMID: 3893033 [PubMed - indexed for MEDLINE]

☐ 295: Brooks DE, Trust TJ. Related Articles, Links

Interactions of erythrocytes with bacteria under shear.
Ann N Y Acad Sci. 1983;416:319-31. No abstract available.
PMID: 6145382 [PubMed - indexed for MEDLINE]

☐ 296: Jones GW, Isaacson RE. Related Articles, Links

Proteinaceous bacterial adhesins and their receptors.
Crit Rev Microbiol. 1983;10(3):229-60. Review.
PMID: 6138214 [PubMed - indexed for MEDLINE]

☐ 297: Moore RL, Marshall KC. Related Articles, Links

Attachment and Rosette Formation by Hyphomicrobia.
Appl Environ Microbiol. 1981 Nov;42(5):751-757.
PMID: 16345878 [PubMed - as supplied by publisher]

☐ 298: Morse ML. Related Articles, Links

PRELIMINARY GENETIC MAP OF SEVENTEEN GALACTOSE MUTATIONS IN E. COLI K-12.
Proc Natl Acad Sci U S A. 1962 Aug;48(8):1314-8. No abstract available.
PMID: 16590979 [PubMed]

Hung CS, Bouckaert J, Hung D, Pinkner J, Widberg C, DeFusco A, Auguste CG, Strouse R, Langermann S, Waksman G, Hultgren SJ. Related Articles, Links

Structural basis of tropism of Escherichia coli to the bladder during urinary tract infection.
Mol Microbiol. 2002 May;44(4):903-15.
PMID: 12010488 [PubMed - indexed for MEDLINE]

216: Qian X, Metallo SJ, Choi IS, Wu H, Liang MN, Whitesides GM. Related Articles, Links

Arrays of self-assembled monolayers for studying inhibition of bacterial adhesion.
Anal Chem. 2002 Apr 15;74(8):1805-10.
PMID: 11985311 [PubMed - indexed for MEDLINE]

217: Min G, Stolz M, Zhou G, Liang F, Sebbel P, Stoffler D, Glockshuber R, Sun TT, Aebi U, Kong XP. Related Articles, Links

Localization of uroplakin Ia, the urothelial receptor for bacterial adhesin FimH, on the six inner domains of the 16 nm urothelial plaque particle.
J Mol Biol. 2002 Apr 12;317(5):697-706.
PMID: 11955018 [PubMed - indexed for MEDLINE]

218: Lin CC, Yeh YC, Yang CY, Chen CL, Chen GF, Chen CC, Wu YC. Related Articles, Links

Selective binding of mannose-encapsulated gold nanoparticles to type 1 pili in Escherichia coli.
J Am Chem Soc. 2002 Apr 10;124(14):3508-9. No abstract available.
PMID: 11929231 [PubMed - indexed for MEDLINE]

219: Kornberg H. Related Articles, Links

If at first you don't succeed em leaderfructose utilization by Escherichia coli.
Adv Enzyme Regul. 2002;42:349-60. Review. No abstract available.
PMID: 12123725 [PubMed - indexed for MEDLINE]

220: Martin MJ, Martin-Sosa S, Hueso P. Related Articles, Links

Binding of milk oligosaccharides by several enterotoxigenic Escherichia coli strains isolated from calves.
Glycoconj J. 2002 Jan;19(1):5-11.
PMID: 12652075 [PubMed - indexed for MEDLINE]

221: Kjaergaard K, Schembri MA, Klemm P. Related Articles, Links

Novel Zn(2+)-chelating peptides selected from a fimbria-displayed random peptide library.
Appl Environ Microbiol. 2001 Dec;67(12):5467-73.
PMID: 11722894 [PubMed - indexed for MEDLINE]

222: Choi BK, Schifferli DM. Related Articles, Links

Characterization of FasG segments required for 987P fimbria-mediated binding to piglet glycoprotein receptors.
Infect Immun. 2001 Nov;69(11):6625-32.
PMID: 11598031 [PubMed - indexed for MEDLINE]

223: Zhou G, Mo WJ, Sebbel P, Min G, Neubert TA, Glockshuber R, Wu XR, Sun TT, Kong XP. Related Articles, Links

Uroplakin Ia is the urothelial receptor for uropathogenic Escherichia coli: evidence from in vitro FimH binding.
J Cell Sci. 2001 Nov;114(Pt 22):4095-103.
PMID: 11739641 [PubMed - indexed for MEDLINE]

☐ 224: Chesnokova VL, Rieger P, Sokurenko EV. Related Articles, Links

Regulation of type 1 pili expression as exemplified by Escherichia coli strain m17.
Bull Exp Biol Med. 2001 Oct;132(4):977-80.
PMID: 11782798 [PubMed - indexed for MEDLINE]

☐ 225: Lorthois S, Schmitz P, Angles-Cano E. Related Articles, Links

Experimental Study of Fibrin/Fibrin-Specific Molecular Interactions Using a Sphere/Plane Adhesion Model.
J Colloid Interface Sci. 2001 Sep 1;241(1):52-62.
PMID: 11502107 [PubMed - as supplied by publisher]

☐ 226: Schembri MA, Christiansen G, Klemm P. Related Articles, Links

FimH-mediated autoaggregation of Escherichia coli.
Mol Microbiol. 2001 Sep;41(6):1419-30.
PMID: 11580845 [PubMed - indexed for MEDLINE]

☐ 227: Bureau L, Baumberger T, Caroli C. Related Articles, Links

Jamming creep of a frictional interface.
Phys Rev E Stat Nonlin Soft Matter Phys. 2001 Sep;64(3 Pt 1):031502. Epub 2001 Aug 27.
PMID: 11580337 [PubMed]

☐ 228: Sokurenko EV, Schembri MA, Trintchina E, Kjaergaard K, Hasty DL, Klemm P. Related Articles, Links

Valency conversion in the type 1 fimbrial adhesin of Escherichia coli.
Mol Microbiol. 2001 Aug;41(3):675-86.
PMID: 11532135 [PubMed - indexed for MEDLINE]

☐ 229: Sung MA, Fleming K, Chen HA, Matthews S. Related Articles, Links

The solution structure of PapGII from uropathogenic Escherichia coli and its recognition of glycolipid receptors.
EMBO Rep. 2001 Jul;2(7):621-7. Epub 2001 Jul 3.
PMID: 11454740 [PubMed - indexed for MEDLINE]

☐ 230: Harris SL, Spears PA, Havell EA, Hamrick TS, Horton JR, Orndorff PE. Related Articles, Links

Characterization of Escherichia coli type 1 pilus mutants with altered binding specificities.
J Bacteriol. 2001 Jul;183(13):4099-102.
PMID: 11395476 [PubMed - indexed for MEDLINE]

☐ 231: Dodson KW, Pinkner JS, Rose T, Magnusson G, Hultgren SJ, Waksman G. Related Articles, Links

Structural basis of the interaction of the pyelonephritic E. coli adhesin to its human kidney receptor.
Cell. 2001 Jun 15;105(6):733-43.
PMID: 11440716 [PubMed - indexed for MEDLINE]

☐ 232: Grover V, Ghosh S, Sharma N, Chakraborti A, Majumdar S, Ganguly NK. Related Articles, Links

Characterization of a galactose specific adhesin of enteroaggregative Escherichia coli.
Arch Biochem Biophys. 2001 Jun 1;390(1):109-18.
PMID: 11368522 [PubMed - indexed for MEDLINE]

☐ 233: Pak J, Pu Y, Zhang ZT, Hasty DL, Wu XR. Related Articles, Links

Tamm-Horsfall protein binds to type 1 fimbriated Escherichia coli and prevents E. coli from binding to uroplakin Ia and Ib receptors.

J Biol Chem. 2001 Mar 30;276(13):9924-30. Epub 2000 Dec 27.
PMID: 11134021 [PubMed - indexed for MEDLINE]

234: Schembri MA, Klemm P. Related Articles, Links

Biofilm formation in a hydrodynamic environment by novel fimh variants and ramifications for virulence.
Infect Immun. 2001 Mar;69(3):1322-8.
PMID: 11179294 [PubMed - indexed for MEDLINE]

235: Schembri MA, Kjaergaard K, Sokurenko EV, Klemm P. Related Articles, Links

Molecular characterization of the Escherichia coli FimH adhesin.
J Infect Dis. 2001 Mar 1;183 Suppl 1:S28-31. Review. No abstract available.
PMID: 11171009 [PubMed - indexed for MEDLINE]

236: Sung MA, Chen HA, Matthews S. Related Articles, Links

Sequential assignment and secondary structure of the triple-labelled carbohydrate-binding domain of papG from uropathogenic E. coli.
J Biomol NMR. 2001 Feb;19(2):197-8. No abstract available.
PMID: 11256819 [PubMed - indexed for MEDLINE]

237: Peek AS, Souza V, Eguiarte LE, Gaut BS. Related Articles, Links

The interaction of protein structure, selection, and recombination on the evolution of the type-1 fimbrial major subunit (fimA) from Escherichia coli.
J Mol Evol. 2001 Feb;52(2):193-204.
PMID: 11244580 [PubMed - indexed for MEDLINE]

238: Liang MN, Smith SP, Metallo SJ, Choi IS, Prentiss M, Whitesides GM. Related Articles, Links

Measuring the forces involved in polyvalent adhesion of uropathogenic Escherichia coli to mannose-presenting surfaces.
Proc Natl Acad Sci U S A. 2000 Nov 21;97(24):13092-6.
PMID: 11078520 [PubMed - indexed for MEDLINE]

239: Chang KC, Tees DF, Hammer DA. Related Articles, Links

The state diagram for cell adhesion under flow: leukocyte rolling and firm adhesion.
Proc Natl Acad Sci U S A. 2000 Oct 10;97(21):11262-7.
PMID: 11005837 [PubMed - indexed for MEDLINE]

240: Zubritsky E. Related Articles, Links

Driven by shear force
Anal Chem. 2000 Aug 1;72(15):518A. No abstract available.
PMID: 10952509 [PubMed - as supplied by publisher]

241: Schembri MA, Hasman H, Klemm P. Related Articles, Links

Expression and purification of the mannose recognition domain of the FimH adhesin.
FEMS Microbiol Lett. 2000 Jul 15;188(2):147-51.
PMID: 10913698 [PubMed - indexed for MEDLINE]

242: Hamrick TS, Harris SL, Spears PA, Havell EA, Horton JR, Russell PW, Orndorff PE. Related Articles, Links

Genetic characterization of Escherichia coli type 1 pilus adhesin mutants and identification of a novel binding phenotype.
J Bacteriol. 2000 Jul;182(14):4012-21.
PMID: 10869080 [PubMed - indexed for MEDLINE]

Mono mannose

243: Schembri MA, Sokurenko EV, Klemm P. Related Articles, Links

Functional flexibility of the FimH adhesin: insights from a random mutant library.
Infect Immun. 2000 May;68(5):2638-46.
PMID: 10768955 [PubMed - indexed for MEDLINE]

244: Arne P, Marc D, Bree A, Schouler C, Dho-Moulin M. Related Articles, Links

Increased tracheal colonization in chickens without impairing pathogenic properties of avian pathogenic Escherichia coli MT78 with a fimH deletion.
Avian Dis. 2000 Apr-Jun;44(2):343-55.
PMID: 10879915 [PubMed - indexed for MEDLINE]

245: Gounon P, Jouve M, Le Bouguenec C. Related Articles, Links

Immunocytochemistry of the AfaE adhesin and AfaD invasin produced by pathogenic Escherichia coli strains during interaction of the bacteria with HeLa cells by high-resolution scanning electron microscopy.
Microbes Infect. 2000 Apr;2(4):359-65.
PMID: 10817637 [PubMed - indexed for MEDLINE]

246: Lang H, Maki M, Rantakari A, Korhonen TK. Related Articles, Links

Use of the OmpS-display--system to localize the receptor-binding region in the PapG adhesin of uropathogenic Escherichia coli.
Adv Exp Med Biol. 2000;485:133-6. No abstract available.
PMID: 11109098 [PubMed - indexed for MEDLINE]

247: Kjaergaard K, Sorensen JK, Schembri MA, Klemm P. Related Articles, Links

Sequestration of zinc oxide by fimbrial designer chelators.
Appl Environ Microbiol. 2000 Jan;66(1):10-4.
PMID: 10618196 [PubMed - indexed for MEDLINE]

248: Lin TJ, Gao Z, Arock M, Abraham SN. Related Articles, Links

Internalization of FimH+ Escherichia coli by the human mast cell line (HMC-1 5C6) involves protein kinase C.
J Leukoc Biol. 1999 Dec;66(6):1031-8.
PMID: 10614787 [PubMed - indexed for MEDLINE]

249: Choi BK, Schifferli DM. Related Articles, Links

Lysine residue 117 of the FasG adhesin of enterotoxigenic Escherichia coli is essential for binding of 987P fimbriae to sulfatide.
Infect Immun. 1999 Nov;67(11):5755-61.
PMID: 10531225 [PubMed - indexed for MEDLINE]

250: Shin JS, Gao Z, Abraham SN. Related Articles, Links

Bacteria-host cell interaction mediated by cellular cholesterol/glycolipid-enriched microdomains.
Biosci Rep. 1999 Oct;19(5):421-32.
PMID: 10763810 [PubMed - indexed for MEDLINE]

251: Malaviya R, Gao Z, Thankavel K, van der Merwe PA, Abraham SN. Related Articles, Links

The mast cell tumor necrosis factor alpha response to FimH-expressing Escherichia coli is mediated by the glycosylphosphatidylinositol-anchored molecule CD48.
Proc Natl Acad Sci U S A. 1999 Jul 6;96(14):8110-5.
PMID: 10393956 [PubMed - indexed for MEDLINE]

Wizemann TM, Adamou JE, Langermann S. Related Articles, Links

☐ 252:

Adhesins as targets for vaccine development.
Emerg Infect Dis. 1999 May-Jun;5(3):395-403. Review.
PMID: 10341176 [PubMed - indexed for MEDLINE]

☐ 253: Pellecchia M, Sebbel P, Hermanns U, Wuthrich K, Glockshuber R. Related Articles, Links

Pilus chaperone FimC-adhesin FimH interactions mapped by TROSY-NMR.
Nat Struct Biol. 1999 Apr;6(4):336-9.
PMID: 10201401 [PubMed - indexed for MEDLINE]

☐ 254: Chang KC, Hammer DA. Related Articles, Links

The forward rate of binding of surface-tethered reactants: effect of relative motion between two surfaces.
Biophys J. 1999 Mar;76(3):1280-92.
PMID: 10049312 [PubMed - indexed for MEDLINE]

☐ 255: Soto GE, Dodson KW, Ofek I, Log SJ, Jr, Hultgren SJ. Related Articles, Links

Functional scanning mutagenesis of the uropathogenic Escherichia coli FimH adhesin.
J Bacteriol. 1998 Dec;180(24):6670-7.
PMID: 9852021 [PubMed - indexed for MEDLINE]

☐ 256: Schembri MA, Kjaergaard K, Klemm P. Related Articles, Links

Global attenuation of Escherichia coli virulence by altered fimbrial adhesin expression.
Microbiology. 1998 Jul;144 (Pt 7):1753-61.
PMID: 9695904 [PubMed - indexed for MEDLINE]

☐ 257: Grange PA, Erickson AK, Levery SB, Francis DH. Related Articles, Links

Identification of an intestinal neutral glycosphingolipid as a phenotype-specific receptor for the K88ad fimbrial adhesin of Escherichia coli.
Infect Immun. 1999 Jan;67(1):165-72.
PMID: 9864211 [PubMed - indexed for MEDLINE]

☐ 258: [No authors listed] Related Articles, Links

Correction: Inhibition of the Adherence of P-Fimbriated Escherichia coli to Uroepithelial-Cell Surfaces by Proanthocyanidin Extracts from Cranberries.
N Engl J Med. 1998 Nov 5;339(19):1408. No abstract available.
PMID: 9801404 [PubMed - as supplied by publisher]

☐ 259: Sokurenko EV, Chesnokova V, Dykhuizen DE, Ofek I, Wu XR, Krogfelt KA, Struve C, Schembri MA, Hasty DL. Related Articles, Links

Pathogenic adaptation of Escherichia coli by natural variation of the FimH adhesin.
Proc Natl Acad Sci U S A. 1998 Jul 21;95(15):8922-6.
PMID: 9671780 [PubMed - indexed for MEDLINE]

☐ 260: Knudsen TB, Klemm P. Related Articles, Links

Probing the receptor recognition site of the FimH adhesin by fimbriae-displayed FimH-FocH hybrids.
Microbiology. 1998 Jul;144 (Pt 7):1919-29.
PMID: 9695925 [PubMed - indexed for MEDLINE]

☐ 261: Lindhorst TK, Kieburg C, Krallmann-Wenzel U. Related Articles, Links

Inhibition of the type 1 fimbriae-mediated adhesion of Escherichia coli to erythrocytes by multiantennary alpha-mannosyl clusters: the effect of multivalency.

PMID: 7476411 [PubMed - indexed for MEDLINE]

☐ 280: Haataja S, Tikkanen K, Nilsson U, Magnusson G, Karlsson KA, Finne J. Related Articles, Links

Oligosaccharide-receptor interaction of the Gal alpha 1-4Gal binding adhesin of Streptococcus suis. Combining site architecture and characterization of two variant adhesin specificities.
J Biol Chem. 1994 Nov 4;269(44):27466-72.
PMID: 7961660 [PubMed - indexed for MEDLINE]

☐ 281: Malaviya R, Ross E, Jakschik BA, Abraham SN. Related Articles, Links

Mast cell degranulation induced by type 1 fimbriated Escherichia coli in mice.
J Clin Invest. 1994 Apr;93(4):1645-53.
PMID: 7512987 [PubMed - indexed for MEDLINE]

☐ 282: Madison B, Ofek I, Clegg S, Abraham SN. Related Articles, Links

Type 1 fimbrial shafts of Escherichia coli and Klebsiella pneumoniae influence sugar-binding specificities of their FimH adhesins.
Infect Immun. 1994 Mar;62(3):843-8.
PMID: 7906676 [PubMed - indexed for MEDLINE]

☐ 283: Malaviya R, Ross EA, MacGregor JI, Ikeda T, Little JR, Jakschik BA, Abraham SN. Related Articles, Links

Mast cell phagocytosis of FimH-expressing enterobacteria.
J Immunol. 1994 Feb 15;152(4):1907-14.
PMID: 8120397 [PubMed - indexed for MEDLINE]

☐ 284: Hetfleisch-Stephan J, Schunk A, Rudiger H. Related Articles, Links

[Synthesis of antibiotic-glycoside conjugates as potential ligands for bacterial lectins]
Pharmazie. 1994 Feb-Mar;49(2-3):125-30. German.
PMID: 8171076 [PubMed - indexed for MEDLINE]

☐ 285: Rosenstein IJ. Related Articles, Links

The use of lipid-linked oligosaccharides (neoglycolipids) in the identification of carbohydrate receptors for microbial pathogens.
Biomed Pharmacother. 1994;48(7):319-26.
PMID: 7858163 [PubMed - indexed for MEDLINE]

☐ 286: Ohmura N, Kitamura K, Saiki H. Related Articles, Links

Selective Adhesion of Thiobacillus ferrooxidans to Pyrite.
Appl Environ Microbiol. 1993 Dec;59(12):4044-4050.
PMID: 16349106 [PubMed - as supplied by publisher]

☐ 287: Tewari R, MacGregor JI, Ikeda T, Little JR, Hultgren SJ, Abraham SN. Related Articles, Links

Neutrophil activation by nascent FimH subunits of type 1 fimbriae purified from the periplasm of Escherichia coli.
J Biol Chem. 1993 Feb 5;268(4):3009-15.
PMID: 8094080 [PubMed - indexed for MEDLINE]

☐ 288: Krogfelt KA, Bergmans H, Klemm P. Related Articles, Links

Direct evidence that the FimH protein is the mannose-specific adhesin of Escherichia coli type 1 fimbriae.
Infect Immun. 1990 Jun;58(6):1995-8.
PMID: 1971261 [PubMed - indexed for MEDLINE]

☐ 299: Robinson BB. Related Articles, Links

RELATIVISTIC UNIVERSES WITH SHEAR.
Proc Natl Acad Sci U S A. 1961 Nov;47(11):1852-7. No abstract available.
PMID: 16590907 [PubMed]

☐ 300: OSBORN MJ, McLELLAN WL Jr, HORECKER BL. Related Articles, Links

Galactose transport in Escherichia coli. III. The effect of 2,4-dinitrophenol on entry and accumulation.
J Biol Chem. 1961 Oct;236:2585-9. No abstract available.
PMID: 14482458 [PubMed - indexed for MEDLINE]

☐ 301: ROTMAN B, GUZMAN R. Related Articles, Links

Transport of galactose from the inside to the outside of Escherichia coli.
Pathol Biol (Paris). 1961 Apr;9:806-10. No abstract available.
PMID: 13743917 [PubMed - indexed for MEDLINE]

☐ 302: HORECKER BL, THOMAS J, MONOD J. Related Articles, Links

Galactose transport in Escherichia coli. I. General properties as studied in a galactokinaseless mutant.
J Biol Chem. 1960 Jun;235:1580-5. No abstract available.
PMID: 14403098 [PubMed - indexed for MEDLINE]

☐ 303: HORECKER BL, THOMAS J, MONOD J. Related Articles, Links

Galactose transport in Escherichia coli. II. Characteristics of the exit process.
J Biol Chem. 1960 Jun;235:1586-90. No abstract available.
PMID: 14403097 [PubMed - indexed for MEDLINE]

☐ 304: KURAHASHI K, SUGIMURA A. Related Articles, Links

Purification and properties of galactose 1-phosphate uridyl transferase from Escherichia coli.
J Biol Chem. 1960 Apr;235:940-6. No abstract available.
PMID: 14412847 [PubMed - indexed for MEDLINE]

☐ 305: Yarmolinsky MB, Wiesmeyer H, Kalckar HM, Jordan E. Related Articles, Links

HEREDITARY DEFECTS IN GALACTOSE METABOLISM IN ESCHERICHIA COLI MUTANTS, II. GALACTOSE-INDUCED SENSITIVITY.
Proc Natl Acad Sci U S A. 1959 Dec;45(12):1786-91. No abstract available.
PMID: 16590576 [PubMed]

☐ 306: Draper CS, Finston M. Related Articles, Links

HIGH-ACCURACY MECHANICAL INTEGRATION BY SHEAR IN VISCOUS LIQUIDS.
Proc Natl Acad Sci U S A. 1959 Apr;45(4):528-49. No abstract available.
PMID: 16590410 [PubMed]

☐ 307: BECKETT AH, PATKI SJ, ROBINSON AE. Related Articles, Links

Interaction of phenolic compounds with bacteria.
Nature. 1958 Mar 8;181(4610):712. No abstract available.
PMID: 13517280 [PubMed - indexed for MEDLINE]

☐ 308: BARKER SA, BOURNE EJ. Related Articles, Links

The oligosaccharides synthesized by Escherichia coli from maltose.
Biochem J. 1951 Sep;49(4):lxi. No abstract available.
PMID: 14886342 [PubMed - OLDMEDLINE]

☐ **309:** MONOD J, TORRIANI AM. Related Articles, Links

[Amylomaltase of Escherichia coli.]
Ann Inst Pasteur (Paris). 1950 Jan;78(1):65-77. Undetermined Language. No abstract available.
PMID: 15413815 [PubMed - indexed for MEDLINE]

☐ **310:** Houlihan RB, Copley AL. Related Articles, Links

The Adhesion of Rabbit Platelets to Bacteria.
J Bacteriol. 1946 Oct;52(4):439-48. No abstract available.
PMID: 16561197 [PubMed]

☐ **311:** Harkins WD. Related Articles, Links

Cohesion, Internal Pressure, Adhesion, Tensile Strength, Tensile Energy, Negative Surface Energy, and Molecular Attraction.
Proc Natl Acad Sci U S A. 1919 Dec;5(12):562-8. No abstract available.
PMID: 16576432 [PubMed]

Display Summary Show 500 Pub Date Send to

Mar 19 2007 07:18:03